



# THE WINN FELINE FOUNDATION

For the Health and Well-Being of All Cats

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Blood & Urine Tests for Cats  
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## Blood Tests

There are many situations in which testing blood samples can be helpful. A common use would be as part of a preventative health care program. For instance, a veterinarian might recommend that a newly adopted cat be blood tested for certain viral diseases. Or a veterinarian might advise pre-anesthetic blood screening before any elective surgery. Such screening tests help identify hidden problems and also serve as a baseline for future monitoring of the cat's health. Blood testing is also used to diagnose medical conditions and then to monitor the progress of treatment.

A variety of very specialized blood tests are available and the list is growing each year. Different commercial labs and university labs have developed specialized tests for certain diseases and situations. Many infectious diseases have specialized blood tests. In some cases, there are various types of tests available to detect one disease and the veterinarian will have to choose the test most applicable to the patient.

**1) Complete Blood Count (CBC):** The complete blood count is one of the most commonly employed blood tests in veterinary medicine. This test is designed to evaluate the red and white blood cells. A total white blood cell count is determined and then the individual types of white blood cells are examined and counted as a percentage of the total count (the "differential"). Typically, some components of the CBC are done manually in the clinic laboratory and other components must be done by machine. The total red blood cell count, hemoglobin determination, and evaluation of the red blood cell size and volume are usually done by machine, sometimes in a referral laboratory. A separate red blood cell test, the hematocrit (Hct) or packed cell volume (PCV), can be done using a centrifuge in the veterinary office. Additionally, the CBC also evaluates platelets, the blood cells responsible for blood clotting.

Typically, the CBC is used to evaluate the patient for evidence of infection or inflammation. Evidence for blood parasites such as *Mycoplasma haemofelis* (formerly *Hemobartonella felis*) may be found. Information from the CBC can be used to determine how long the problem has been present, and whether the cause of an infection is likely to be viral, bacterial, or fungal. The red blood cell tests can help assess anemia and characterize its nature. Altogether, the CBC can also be used to help evaluate a wide variety of problems, including bone marrow disease, some endocrine diseases, and some toxicities.

**2) Serum Chemistries:** One of the most useful diagnostic aids in veterinary medicine is the serum chemistry panel. This is a collection of blood tests used to assess the function of major organs and body systems. Chemistry panels vary in size by the number of tests ordered and the focus of the tests. For example, a chemistry panel may be general in scope, or it may focus on kidney or liver function. Some important parts of the chemistry panel are the total protein, electrolytes, glucose, urea nitrogen, creatinine, and liver enzymes.

The serum total protein is made up primarily of albumin and globulin. Albumin is a protein produced in the liver and the globulins are components of the immune system used to

fight diseases. Low levels of protein in the blood (hypoproteinemia) are associated with diseases that interfere with protein production (such as liver and intestinal diseases), or loss of protein through intestinal or kidney disease. Increased levels of protein in the blood (hyperproteinemia) can occur through dehydration, shock, infection, and some immune system disorders.

Electrolytes are chemicals necessary for life. The main ones evaluated in veterinary medicine are sodium, potassium, and chloride. Electrolyte imbalances can be due to several disorders, including excessive vomiting or diarrhea, and kidney or endocrine diseases.

Blood glucose is the simple sugar that is the major energy source for the body's cells. Increases in blood glucose levels (hyperglycemia) are associated with stress or anxiety, but also with diseases such as diabetes mellitus. Low blood glucose levels (hypoglycemia) can be a complication of insulin therapy, of inadequate nutritional intake in a young kitten, or of less common problems, such as tumors.

Blood urea nitrogen (BUN) and creatinine are waste products of metabolism normally found in low levels in the blood. They are cleared from the body via the kidney; so increased levels may point to kidney disease. The BUN may also be increased in cases of dehydration or decreased in severe liver disease.

Serum enzymes are a type of protein associated with cellular function. Certain enzymes found in the blood are associated with certain organs. Most typically, enzymes associated with the liver are evaluated. Since the liver can also react to diseases in other parts of the body, an increase in liver enzymes might be associated with intestinal disease or hyperthyroidism, for example, in addition to liver disease. Veterinarians can gain clues to the cause of a cat's illness by evaluating the pattern of liver enzyme elevations.

**3) Viral tests:** Veterinarians now routinely use blood samples to screen for specific viral infections. The most commonly used and reliable tests are for feline leukemia virus (FeLV) and feline immunodeficiency virus (FIV). In-clinic screening tests employing ELISA (enzyme-linked immunosorbent assay) technology are used as a rapid, low cost method of assessing cats for these two viruses. All viral test methods come with attendant risks of false positive and false negative results. ELISA tests for FeLV detect viral antigen and ELISA tests for FIV detect antibodies to the virus. Any positive result from an ELISA test should be followed up by a second test methodology. PCR (polymerase chain reaction) tests directly assay viral antigens and can detect the presence of a very small amount of virus. Many labs now offer PCR tests for infectious diseases.

Another common feline disease is feline infectious peritonitis virus (FIP), caused by a virulent biotype of coronavirus. While no accurate and reliable blood test exists to detect FIP, several antibody and viral antigen tests for feline coronavirus are available commercially. These tests are very difficult to use and interpret. Currently, no reliable tests are available that are suitable for screening purposes in healthy cats, although some labs offer them as such. Results of coronavirus testing can be used as part of an overall diagnostic effort to help rule in or rule out FIP as the cause of illness in a sick cat, however.

**4) Thyroid Hormone:** In feline medicine, routine evaluation of thyroid hormone levels is common, especially for senior cats. While dogs might commonly suffer from an underactive thyroid gland and low levels of thyroid hormone in the blood (hypothyroidism), cats typically suffer from an overactive thyroid and high levels of thyroid hormone in the blood (hyperthyroidism). While certain findings on other routine blood tests can aid in the diagnosis of feline hyperthyroidism, veterinarians can also measure the thyroid hormone level itself. Since thyroid hormone comes in different forms, the most common hormone assayed is thyroxine (also called T4).

## Urinalysis

Urine tests are useful in the diagnosis of many diseases in the cat, including lower urinary tract disease, kidney disease, diabetes, and others. A urinalysis is divided into two parts: chemical analysis and examination of urine sediment. Chemical reagent test strips are used to check urine samples for the presence of several substances, such as blood (present due to infection or inflammation), glucose (present in diabetes), bilirubin (present in liver disease) and others. The concentration of the urine is also evaluated and is called the specific gravity. A specific gravity that is too high (a concentrated urine sample) can be associated with conditions such as dehydration. A specific gravity that is too low (a dilute urine sample) can be associated with many diseases, such as kidney disease, diabetes mellitus, hyperthyroidism and others.

Examination of the urine sediment involves centrifuging the sample in order to concentrate the cells present. When a urine sample is centrifuged, a small layer of sediment forms at the bottom of the test tube. This sediment is stained with a special dye and examined under the microscope. The number of red and white blood cells is counted. The sample is examined for bacteria. Any abnormal or unusual cells are noted. Mineral crystals, associated with lower urinary tract disease, are also noted.

Finally, the sample may be submitted for culture. Urine samples destined for culture must be obtained in a sterile manner to avoid contamination. Cystocentesis is a rapid and relatively painless procedure commonly employed to collect urine samples in a sterile manner. In this method, a thin needle is placed through the abdominal wall into the bladder and a urine sample is withdrawn into a syringe. The sample can then be sent to a commercial laboratory, where an attempt will be made to culture any bacteria present. The veterinarian can also ask the laboratory to test any bacteria found against a panel of antibiotics in order to find the appropriate drug for treatment.

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